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## Experiencing the Future Car: Anticipatory UX as a Social and Digital Phenomenon

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# Experiencing the Future Car

## Anticipatory UX as a social and digital phenomenon

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**Abstract.** In order to be innovative and competitive, the automotive industry seeks to understand how to attract new customers, even before they have experienced the product. User Experience (UX) research often provides insights into situated uses of products, and reflections after their use, however tells us little about how products and services are experienced before use. We propose anticipation theory as a way to understand how shared experiences between people in an online discussion forum relate to UX of cars before they are actually experienced in real-life. We took an ethnographic approach to analyse the activities of members of a self-organised web-based discussion forum for Tesla car enthusiasts, to understand how product anticipation emerges in a digital-material setting. Our study identifies how anticipatory experiences create UX of car ownership which evolves through members' engagement in a self-organised online community enabled through the digitalisation and connectivity of the car, and how such car experiences generate new forms of digital anticipation of the car. We conclude that the shift towards digitalisation of cars and subscription services creates a need for more interdisciplinary research into spatial and temporal aspects, where socially shared anticipatory experiences are increasingly important for the overall UX.

*Key words:* user experience; anticipation; expectations; automotive; communities of practice; online forum; netnography

## 1 Introduction

Current trends in the automotive industry dramatically affect how people experience cars. Digitalisation, connectivity, and automation open up new types of car experiences (Ferràs-Hernández et al. 2017; Svängren et al. 2017), the automotive industry increas-

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ingly re-frames their business models from manufacturing and selling cars as products toward providing mobility as a service to customers (Schrieck et al. 2018; Utriainen and Pöllänen 2018). These developments change how cars are experienced in everyday life, and thus how UX design in the context of digitalised cars can be approached (Gao et al. 2016). In this article we discuss the implications of these changes further, we are concerned with: their implications for how UX evolves in emerging digital-physical contexts; the consequences of this for our theorization of UX; and subsequently how the automotive industry should adapt in order to provide UX design that enhances car experiences for potential customers. Four aspects of the new digital, connected and automated context associated with the future car are of particular interest for our discussion.

First, the common understanding is that the car is gradually shifting from a stand-alone product to becoming a part of mobility services. This shift integrates the car from being a stand-alone experience towards a more integrated service-dominated experience in people's everyday lives (Brugnoli 2009; Lusch and Vargo 2006). Digital services (Williams et al. 2008) combined with business models based on subscription rates generate new forms of evolving relationships to the car through car-on-demand and car-sharing services via mobile apps. User's product and service options will increase in number, while the time available to experience and learn about a product or a service will decrease. This will subsequently increase the importance of attracting customers to the service before they actually use the product (Garbarino and Johnson 1999).

Second, the digitalisation of cars is exemplified through the shift to online stores instead of traditional dealerships (Scherpen et al. 2018) and as remote car accessibility and reconfiguration via connectivity becomes possible for customers (Coppola and Morisio 2016). This shifts the former physical experience of the car to a digital-material experience, whereby the digital and material qualities of the car cannot be regarded as separated from each other (Pink et al. 2016). Thus, what traditionally would have been a physical purchase experience with a material technology, in a face-to-face context, will become an experience with both digital and material dimensions. However we do not yet have a full understanding of how this impacts on either users' expectations or on the overall UX (Immonen et al. 2018).

Third, cars' increased connectivity through digital platform services and computation capabilities, cater for the possibility of software updates during the car's life-time and automation through artificial intelligence which adapts to the user's behaviours and needs (Coppola and Morisio 2016). This provides UX designers with tools through which to continuously evolve users' expectations and experiences during the life-time of the car (Gomes and Preto 2018; Lyyra and Koskinen 2016).

Fourth, consumers act and interact via social media and online brand communities, where expectations and experiences of products are shared and collectively contribute to the brand culture (Schembri and Latimer 2016). Digitalisation connects people with the same interests and makes creation and co-experience easy and fast (Battarbee 2003).

Together, these four aspects of the digitalisation of automotive technology signify a shift where the car will increasingly be experienced by users before they handle it as a physical thing in their everyday life. Simultaneously, research demonstrates a knowledge gap regarding how the new generation of connected and digitalised cars is experienced and integrated in everyday life (Immonen et al. 2018; Ryghaug and Toftaker 2014; Svangren et al. 2017). Thus, a shift in how UX is conceptualised in relation to people's experience of products in various contexts has been argued for (Forlizzi and Battarbee 2004; Hassenzahl and Tractinsky 2006), towards what research (Allam and Dahlan 2013) and industry trends (Gao et al. 2016; Teixeira and Braga 2017) identify as a need to investigate how experiences before use are shaped and how they affect people's expectations of the product.

Research into UX is often characterised by questions of emotion and affect and the relation to context and temporality of experiences (Allam and Dahlan 2013; Hassenzahl and Tractinsky 2006; Karapanos et al. 2009), focusing on how people relate to a product in the present and over time. However, these approaches are not helpful in understanding how emerging and not yet experienced products will be received by customers (Minge and Thüring 2018; Pettersson 2016). The shift towards connected cars, online stores and increased car-related social media channels are all examples of the growth in 'digital materiality', whereby the digital and material worlds and experiences can no longer be seen as separate from each other (Pink et al. 2016). Customers' experiences before actual use are already apparent as people share and coordinate their experiences of products online, thus changing the conditions for why, how, where and when experiences of products actually evolve. In this paper we address the gap this creates in HCI research relating to the context of use and anticipated use, often named key factors of UX (Bargas-Avila and Hornbæk 2011), by examining UX as it emerges through modes of shared anticipation, enabled by digital services.

To demonstrate this we draw on an ethnographic study of members of a web-based discussion forum of Tesla car owners: <http://www.teslaclubsweden.se>. This enabled us to develop new understandings of how the experience of cars evolves through people's engagement in a digital-material setting, from prior to becoming a car user to the time of car ownership. We have applied social theory of human anticipation (Bourdieu 2000; Tavory and Eliasoph 2013) and thereby contribute to a growing field of research that aims to re-think UX as evolving before the actual use of the product. We demonstrate

how a focus on anticipatory experiences can extend current research into UX to account for how users' experiences and expectations through the digital format of a product, prior to encountering it physically, evolve and relate to the overall UX. To explore this empirically the following research question was formulated: *How can we understand anticipation as a socially shared dimension of the user experience of the digitalised car?*

This paper is organised as follows. First, we review the current understanding of how anticipation and UX are related in contemporary research and industry, the phenomenon of anticipation as explained in interdisciplinary research, the social context of digital media, and how these throw new light on socially shared anticipatory experiences. Then we describe the research design followed by the findings. The paper ends with a discussion of the implications and limitations of these findings for expanding our understandings of how user experiences emerge in a digital context, enabled by self-organised learning communities sharing digital-materialities through digital open platforms and ecosystems.

## 2 Related work

### 2.1 Temporal and situated user experience

The notion of UX has long since been embedded in the practice of the HCI community and associated with a broad range of concepts, frameworks and models in order to guide designers in creating possibilities for engaging experiences (Law et al. 2009). Within industry, the ISO 9241-210 standard definition of UX is formulated as “[a] person’s perceptions and responses that result from the use and/or anticipated use of a product, system or service” (ISO 2010). The definition is widely shared within industry and in UX research (Law et al. 2009). According to this definition *anticipated use of...* refers to the phase in which the user imagines their experience before actual use. However, the relationship of this to later phases of experience has often been difficult both to define, and to relate to or acknowledge as being part of the actual momentary use. Subsequently, there has been limited research into this early phase (Bargas-Avila and Hornbæk 2011), despite its presence in the ISO definition and some of the UX frameworks (Pohlmeier et al. 2009), see figure 1.

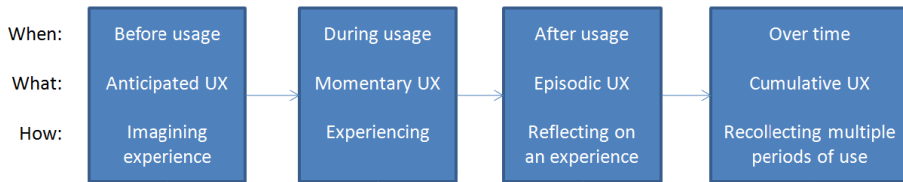


Figure 1. Phases of UX, adapted from (Roto et al. 2011)

In existing literature the notion of Anticipated User Experience (AUX) is defined as people's anticipation of the future product or service, and how this is influenced by their imaginations, desires, expectations and already existing experiences (Eilu and Baguma 2017; Yogasara et al. 2011). According to Yogasara's study, four factors influence AUX: the user's intended use, the user profile, the user's experiential knowledge and the user's anticipated emotions. More recent research has investigated the factors that impact AUX (Eilu 2017) and how to evaluate AUX (Sánchez-Adame et al. 2018). However, social dimensions of anticipated UX and how anticipation evolves in relation to new and emerging technologies and services have been neglected (Ryghaug and Toftaker 2014).

Karapanos et al. (2009) propose an initial framework for UX over time, inspired by theories of product adoption from Silverstone and Haddon (1996) see figure 2. Karapanos et al. (2009) described anticipation as the act of anticipating an experience resulting in the formation of expectations prior to any actual experience in the user's process of adopting new technology, involving the phases of: *orientation* (the user's initial positive and negative experiences with the product functions); *incorporation* (when the product becomes meaningful in the user's everyday life); and *identification* (when the product is connected to the user's self identity). For each phase, different product qualities are appreciated and different forces drive the motivation and transition between phases.

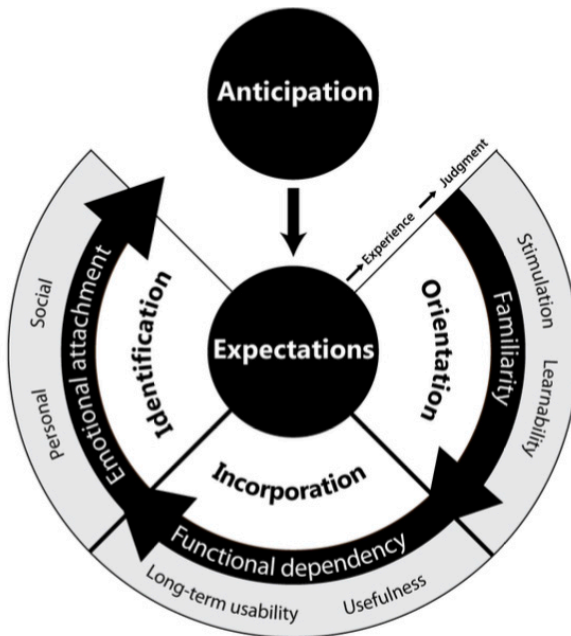


Figure 2. Temporality of experience. (Karapanos et al. 2009)

There is also a tendency in UX research to distinguish between momentary UX (using the physical product) or AUX (imagining the product) (Law et al. 2009). Although the temporalities of UX are acknowledged elsewhere (Kujala et al. 2011; Pettersson 2016), most existing research focuses on the user's actual use of a product or the reflections and changes over time after use. The reason for the focus of momentary experiences in UX research might be related to the challenges in studying socially shared anticipation of UX (Diefenbach et al. 2014), where often contemporary UX research methods are based on cognitive science approaches to measuring instant emotional responses in controlled empirical environments. This limits the extent to which we can fully understand hedonic aspects of a holistic UX that is not only created in the moment of use.

The lack of qualitative methodologies and tools for understanding users' anticipatory experiences also limits the possibilities for UX practitioners to design for a holistic UX of the product. Existing UX research tends to focus mostly on the user's emotions and the product's attributes (Hassenzahl 2005) during the use or the user's motivation to use the product (Hassenzahl et al. 2008), rather than describing the user's evolving modes of anticipation and experiences associated with them. Moreover, attending to the possibilities and effects of sharing experiences via social media and asking how this

might relate to a holistic UX view, encourages us to shift the focus from momentary UX to the social aspects of anticipation (Goh et al. 2013). Indeed as anthropologists argue, we can understand “social media as another place in which people live, alongside their office life, home life and community life” (D. Miller et al. 2016, p. 7), weaving between, or simultaneously being in both digital and material realities (Hjorth and Pink 2014). As demonstrated below, social media offer people platforms through which to: discuss and demonstrate their use of technologies; share experiences in which the digital and material are entangled; collectively imagine future experiences; and as D. Miller et al. (2016, p. 197) suggest, aspire to different lives.

## 2.2 The phenomenon of human anticipation

Anticipation is a general phenomenon that encompasses all efforts that focus on knowing, thinking about, and utilising the future, from the individual to the organizational and societal level (R. Miller et al. 2018). Anticipation of the future is established as an interdisciplinary field of study in its own right (Poli 2017). In this diverse field, anthropologists have argued that to understand future-making, we need to investigate people’s preoccupation with anticipation, imagination and aspiration (Appadurai 2013, p. 286), and sociologists have pointed out that these preoccupations are charged and shaped by human past experiences that have transformed into routines and habits, social and societal norms and structures, and improvisations (Bourdieu 2000). Subsequently, as argued by Tavory and Eliasoph, any interaction is not only connected to the past, but also coordinates people’s “orientations to the future” (Tavory and Eliasoph 2013, p. 909).

According to Tavory and Eliasoph the concept of human anticipation is defined by three categories or modes; *protentions*—which are our instant action or next move; *trajectories*—which add meaning to our protentions through a narrative with a beginning, middle and end; and *plans/temporal landscapes*—that coordinate our actions in relation to the less intentional plans we think are inevitable; e.g.; birthdays, going to work etc. Although, these different modes of anticipation are not mutually interdependent, several modes are ongoing in parallel and are easily shared between people who affect each others’ anticipation. Thus, it is difficult to model a human as a rational being whose individual behaviour or experiences can be predicted. In anticipating the future, several protentions, trajectories and plans are active, people are able to shift easily between modes and adapt to others anticipations or new conditions.

Tavory and Eliasoph’s anticipation theory expands our understanding of anticipation beyond being simply a prior phase of something, to instead being a continuously



evolving phase, socially conditioned and simultaneously related to past experiences and future expectations. Their contribution makes three key points. First, it explains how some of our actions are based in the feeling in the moment, which might not be fully reflected on, and how our experiences are constantly calibrated in our interactions in each specific situation (Suchman, 1985), which cannot be predicted through quantitative modelling. Second, it highlights how identifying trajectories and plans, with a beginning and an end, makes sense of each of our actions (protentions), thus demonstrating how each interaction with a product or service can be seen as a part of a plan for creating relevant experiences. Third, the complexity of managing the different modes of anticipation as they occur in parallel, demonstrates that using cause and effect based frameworks to model and predict UX experiences is limited.

To conceptualise anticipation as part of how people make meaning in their everyday life adds a new layer to the more clinical cause and effect frameworks, often focused on quantitative measurement. An experience is constantly adapted to specific situations and people and is aligned with individual trajectories and plans. The interaction with a product or a service is just one of several trajectories and plans going on in people's everyday lives in their pursuit to create meaning in what they do or anticipate. In other words, nobody can only be a user of a product, since they will always find the meaning of the product in their everyday life, which is inherently social. Thus experiences become created and evaluated with others, moving in and out of the centre of attention in social life as subjects, objects and means for interaction (Battarbee and Koskinen 2005). A wider social perspective on UX is required in order to account for the multiple and changing relationships that influence UX. To understand UX as anticipatory, rather than anticipated, leads us to investigate the user's relationship to a product or a service through a focus on how the product becomes meaningful in the user's own trajectories through different social contexts.

### 3 Research design

Our research design builds on a generative ethnographic approach (Dourish 2007), and to capture the development of social car-ownership anticipation, we applied netnography (Kozinets 2015). Existing examples of ethnographic approaches to qualitative research in this field include studies of cars and car-owner relationships (Hewer and Brownlie 2007; Svangren et al. 2017), and how digitalisation and connectivity affect people's relations to cars (Svangren et al. 2017). Netnography has been acknowledged as having potential to generate understandings of customers (Heinonen and Medberg 2018) and supported our research design in several ways. First, it extended our ability to

follow changes over time and enabled us to track the evolution of anticipation. Second, it offered the possibility to access existing data through which we could track evolution backwards in time. Third, it was an unobtrusive method of observing how anticipation was expressed in social interactions online. Fourth, it enabled us to identify a set of key participants who could be easily contacted for subsequent interviews. Finally, it provided a tool for uncovering unexpected data and studying how experiences were digitally shared and expressed on-line.

Tesla was selected as the automotive brand for our study due to its new and unique ways of providing progressive digitalised, connected and semi-automated cars, and because their models of consumer co-created marketing and online store sales differ from the conventional automotive industry (Zucchi 2018). The independent and self-organised Tesla forum, <http://www.teslaclubsweden.se> was selected as context. At the time of the study, it was a very active and open forum (anyone could become a member) with around 4000 members, growing fast and claimed by the site administrator to have approximately  $\frac{1}{3}$  of Swedish Tesla owners as registered members. In this forum we followed how members' expectations and experiences and their interactions with other forum members evolved through the Tesla ownership process.

The study was undertaken during 10 months in 2017-18. The discussion threads enabled us to engage with both participants' ongoing activities and their biographies in the community. Taking a covert netnographic approach as our starting point enabled us to discover how anticipation and UX progressively unfolded over time through the online conversations without having to interfere in social interactions and anticipatory conversations. The netnography was followed up by in-depth interviews to investigate further emerging themes from the analysis of the online material. Following the ethical code consistent with netnographic research we only quote and identify the participants who explicitly consented to be interviewed. The interviews were undertaken in Swedish and all quotes are transcribed into English. The data collection and analysis was undertaken in three steps.

The first step of the analysis provided a basic overview of the forum structure, member activities and culture, and in doing so disrupted some of our preconceptions of a Tesla owner. It was based on 28 of the recently updated threads in the member presentation section and 25 of the most recent and popular forum discussions in mostly the sections General topics and Model S. A series of themes were identified including: different reasons for becoming Tesla owners; if Tesla owners like to drive or not; expectations of fully autonomous driving; if a continuously evolving (beta software testing) product is a premium experience. The most significant quotations were transcribed for

the second step in the analysis, which focused on the process of becoming a Tesla owner and how this process evolved over time.

For the second step, the aim was to follow, in detail, different narratives about becoming a Tesla owner. Three active and long-term (over 2 years) forum members were selected on the basis of their representing particularly interesting stories that exemplified some of the themes identified in the first step, their engagement in the community, and their having actually bought a Tesla while being active in the forum. We followed them from when they first entered the forum until they became Tesla owners. We analysed how their anticipation evolved over time, which enabled us to gain a broad understanding of how anticipation and ownership were articulated. To do this we collected and analysed their personal presentation threads and additional threads about expectations and experiences in which they had been actively participating.

In the third step, the aim was to validate our findings from the previous two steps, to understand the process of becoming a Tesla owner in more detail, and to identify how anticipation and UX was created and evolved within the community. To undertake this we undertook open-ended in-depth phone interviews (between 30-60 min each) based on the themes developed from the second step with 6 participants – two of whom we had analysed in the second step, and four members (also Tesla owners) who were recruited through a post in the Tesla forum.

The empirical data from the forum threads and phone interviews were coded to group themes and categories by three researchers using thematic analysis (Braun and Clarke 2006) and paper, whiteboards and Atlas.ti as tools. Through this process we created a deeper understanding of how different modes of anticipatory UX could be exemplified. We have presented the findings in detail elsewhere. In Lindgren, Bergquist, et al. (2018) we focused on the process of becoming a Tesla owner through the social platform. In Lindgren, Fors, et al. (2018) we expanded these findings to account for different ways members engage in the community, and how these modes of engagement create opportunities for members to learn how to become a Tesla owner before the car is delivered. In the next section we demonstrate how these findings have produced deeper understandings of the ongoing and continuous anticipatory engagements that becoming a Tesla owner entails, even after the car has been delivered, and the inherently social character of these evolving modes of anticipation.

## 4 Findings

The self-organised online <http://www.teslaclubsweden.se> forum is an open and active community that attracts Swedish Tesla car owners as well as people interested in the

company, the car itself, sustainable energy solutions and electric vehicles. The forum culture is socially inviting for curious new members and the community quickly responds and encourages them to become Tesla owners. The anticipatory narratives of the community members involved concrete experiences of cars, both imagined and real, which are building blocks in socially constructed stories, supported by digital tools and platforms for envisioning and designing their anticipated car on the Tesla website. This, together with the social online community interactions, enhances the possibilities available for anticipating the future, even before experiencing the car in real life. The Tesla owners taking part in the study did not only develop a relationship to the car, but also to the brand itself and to other members of the community, thus creating a broader Tesla ownership experience that was a more holistic UX than that derived from purely using or imaging the car. In the following section we demonstrate how the process of anticipating becoming a car owner, and experiencing owning a car evolves through the possibilities for social engagement in car ownership via social media platforms.

#### 4.1 Evolving anticipatory experiences of owning a car

Elsewhere (Lindgren, Bergquist, et al. 2018) we demonstrate how the experience of becoming a Tesla owner through participating in the digital Tesla forum can be understood as a three-phase process: a) Imagining the future; b) Sharing experiences and expectations; and c) Living the new life. However, rather than seeing these as linear phases within a cumulative process, we highlight how each phase includes modes of anticipation that evolve alongside the process of experiencing the actual car.

The phase *Imagining the future* refers to the starting point of a person's emergent identity as a Tesla owner and the narratives that are used to explain this. These narratives vary from being part of a social movement to the Tesla as the ultimate driving experience, and in them, the Tesla car is the materialization of such anticipated futures. Defining the Tesla Forum as a community of practice (Wenger, 1998) helps us to understand how the anticipated experience of the car unfolds within the practice of becoming a participant in the forum. Key to participation in the forum is a commitment to understanding how to act, what to ask, how to respond and thereby to also learn which feelings, new habits, routines and knowledge can be anticipated. Interviewees characterised becoming an active participant in the Tesla forum as a process of starting as a “lurker”, someone who “peeks in” and reads without writing anything. As Carl explained it:

I became a member when I was on parental leave. I had some time left to sit with the phone. [I] read quite a lot ... thought there were interesting discussions. The atmosphere of the whole forum is much better than any other forum I've been to ... but it took a year before I became a member.

This example shows how the entangled modes of anticipation work. The action of starting to read the forum became relevant in Carl's trajectory of doing something interesting while on parental leave, and the other's members expressed trajectories in the forum influenced him to take the action of signing up as a member in the community. Waiting to become a member is described as deliberate since if a person takes this first step and becomes socially engaged in the community, it is perceived as inevitable that they will take the next step in the process, to become a Tesla owner. This mode of anticipation is indeed itself an experience in relation to owning a car. As Carl continues, by lurking around in the forum, he "got deep down into Tesla and began to secretly read this eminent forum (which, incidentally, has a really good atmosphere)".

The next phase *Sharing experiences and expectations* starts after the transition action of ordering the car online. It not only introduces new activities that emerge and create new experiences, but also organizes the experiences into an inevitable plan to become a real Tesla owner. Sharing the waiting process creates both joyful experiences between members awaiting their cars and the need to accommodate preparations for the car's arrival. Competitions over who will receive their Tesla first are often discussed between members in this phase, as a soon-to-be a Tesla owner expressed it: "*It looks like you are winning who owns a Tesla first*".

The last phase, *Living the new life*, starts at the moment when the Tesla owner collects the car from the Tesla Centre. The moment becomes almost a ceremonial event within the community, where the action of posting a picture of yourself with the car is part of the inevitable plan of becoming a Tesla owner. From now on the shared experiences and narratives of being a Tesla owner become anticipatory experiences that influence other members' and lurkers' trajectories in the community. This phase is not only an ending point of a three-phase process to become a tesla owner, it is also a point of interaction with other Tesla forum members to share experiences that immediately become interwoven with other members' trajectories of anticipation. As John put it, he wants to contribute to this fabric of anticipated experiences and actual experiences by the way he: "... intend[s] to make a small tribute thread with pictures of her and our relationship here!", since he thinks it is "exciting with new updates during the car's life. Both functionality and visually."

## 4.2 The social character of anticipatory experiences

Above we have demonstrated anticipation as an ongoing endeavour that evolves through engaging and participating in the Tesla forum community. Moreover, because the Tesla car continuously evolves through software and functionality updates, anticipatory experiences continue to enrich the UX of the car during ownership. All these ways of engaging in the web-community create anticipatory experiences relating to what to expect and hope for when becoming a Tesla owner before the actual car is ordered or delivered. Through this, forum members not only learn different ways to anticipate car ownership and but also how their anticipation will evolve during ownership.

The Tesla on-line forum in combination with the digitised sales process and connected cars enable a platform for a community of practice to develop. As reported elsewhere (Lindgren, Fors, et al. 2018), anticipatory experiences are created through five different ways in which members gradually engage in the community, in anticipating their future car ownership, as well as existing car owners anticipating their cars evolving through frequently software and functionality updates. These ways of engaging in the forum are inherently social since they are shared between the members, who discuss and demonstrate their use of technologies, share experiences in which the digital and material are entangled and collectively imagine future experiences.

Through our netnographic study we have identified that these sharing practices involve learning the core *values* as well as how to *justify and plan* for buying a Tesla, thereby inviting new participants to understand how the Tesla community values align with their own, and to contribute to the community by sharing their own perspectives. For some people, the car itself was not their main interest in becoming a part of the community, or a car owner, but rather the value of a change to sustainable living. Moreover, while sharing and negotiating values, there was also an educational aspect of sharing *know-how*, which creates a particular social context that exceeds the digital environment and is evident when Tesla forum members confirm their choices in discussions about electrification or autonomous driving functionality. For instance, Adam commented that

everyone wants to confirm that they have taken the right decision ... People who recently bought diesel cars are very prone to listen to the information about why we can't all change to electrified cars and that these are equally bad for the environment. It's a long walk to educate them, but I feel that if you just tell them how it is and keep it to the facts, and that Lithium is not at all a rare mineral etc... that hopefully means that next time they might buy an electric car, and

then they will be in my shoes and will tell others why they have taken the right decision this time.

Another anticipatory mode that exceeds the digital was when forum members needed to accomplish a series of *accommodating* activities to integrate the Tesla car into their everyday life. These anticipated challenges were shared and discussed within the community between Tesla owners and new members and formed a vital element of accommodating the car into everyday life routines. As Adam told us:

You need to make room for it, it's like decorating a nursery ..., for us it was about making it possible to charge in the garage and the house, which was kind of easy, and for our [second] home in Stockholm, where we could find a parking lot with charging close to home was of course more difficult...

Along with educational and material modes of anticipation, the Tesla members shared *emotional* experiences that moved beyond the actual driving experience. For instance, Adam, who read a lot about the latest technology developments, the first or everyday experience of the car was not as special as the anticipation and excitement of reading about new technological advances. As Adam put it:

I don't get big wow-experiences in the car. I get these experiences when I read about what's coming and then later it's more about confirmation

These feelings also emerge in situations such as where James described his first short driving experience in relation to earlier anticipated experiences:

We had talked about having an eco-car for years, an EV-car because we believe it's the future. Then when we took the Tesla for a test drive and it was supercool ... then shit! it is now, it's real, it is really like this!

Therefore, anticipatory experiences are by no means exclusive to non-Tesla owners. Instead, the anticipatory and shared experience constitute the very fabric of how the actual car will be experienced and continue to be anticipated after delivery. The anticipated UX in this digital-material setting has an inherent social dimension, enabled by the platform design and the self-organised character of the conversations in the forum. In other words, the CoP generates anticipatory UX on a number of levels, both for current



owners as they live and learn with the evolving Tesla car and technical developments, and for future owners to enable them to imagine and accommodate their future car.

## 5 Discussion

Above we have exemplified how the new digital materiality and connectivity of cars in combination with social media platforms enables anticipatory UX to emerge before and during the use and ownership of a physical product, continuously evolving and characterized by the social context. While previous definitions of Anticipation and UX mainly relate to it as a phase before the moment of use (Karapanos et al. 2009; Yogasara et al. 2011), our study shows that anticipation of digital material objects in socially shared spaces evolve over time as part of a community of practice. We therefore argue that, when describing UX as a holistic concept, it is important to recognise that UX is not limited to the user and product relationship and that the digital, material and social dimensions of a product experience cannot easily be separated. In the next section we discuss the implications of anticipation as a shared digital, material and social process.

### 5.1 Shared anticipation through digital materialities evolve UX

The digitalization of a) the car, experienced through its different digital materialities and as the ever evolving unfinished product, in combination with b) the self-organised on-line community; enables shared anticipation and co-experience (Battarbee 2003) to blur the line between anticipation and experience. Each active member's shared digital car related anticipations and experiences through the on-line forum, create new experiences and trajectories for other members based on the participants own creativity around the anticipated car; e.g.; how it will feel, what users need to do to accommodate the car into their daily routines, and what kind of knowledge is relevant. The immersion of the digital platform within the materiality of members' everyday life situations, like other social media (D. Miller et al. 2016) encourages the immediate sharing of different modes of anticipation (Tavory and Eliasoph 2013); actions, trajectories and almost inevitable plans concerning car ownership without even owning one yet. The sharing of members' anticipation of the car itself or of ownership in the forum affects other members' anticipation on several levels. E.g. the action of sharing an excel sheet for financing affect other member's anticipation of being able to finance the car. When a forum member discussed and shared the anticipation of his Tesla car configuration in the community by posting specs and images from the online configuration tool,



positive responses from the community created an almost inevitable anticipation that the member would push the order button. Anticipatory experiences are not only applicable to the people waiting to get their Teslas, but also to those who already have them, since the Tesla is a continually evolving product. Therefore, these social experiences and learning, through shared digital materialities, create an anticipatory element of UX that is a part of the total UX of the car.

Referring to Karapanos et al. (2009) framework for UX over time, we found clear evidence in the forum discussions that members in the anticipation phase were already going through the phases of *orientation*, *incorporation* and *identification* without experiencing the car in real-life. For example, The orientation phase and urge to become familiar with the car was shown in Dennis's forum post during his impatient wait for his new Tesla bought online. He shared his joy in learning about the car through the huge amount of digital information about it *"Thankfully, the Model S is a car with a lot of enthusiasts, so it is certainly not short on information and videos to dig into online"*. He also shared an example of the incorporation phase during his wait for the car by improving the usability of the Tesla car smart phone app *"Things you do while waiting, #93782: Moving the Model S-app to the home screen on your mobile..."* We also found examples of how the identification phase and the force of emotional attachment was apparent long before the interest in the car itself, for instance, Adam explained why he identified with a Tesla car although he was generally not interested in cars, *"I'm actually not interested in cars at all, but of course very interested in changing the transportation industry for the sake of the environment"*.

The members' activities can be explained through the notion of a community of practice (CoP), structured around a *shared repertoire* and a *mutual engagement* in a *joint enterprise* (Wenger, 1998, pp. 72-73). The social context of the self-organised on-line forum, in combination with the digital materiality of the car, provides a platform for the Tesla CoP's creativity, learning and anticipatory experiences, whereby a Tesla car can be imagined and experienced collectively. For example, structuring what to hope before delivery or how the experience of owning a Tesla continues to evolve after delivery. The collective enterprise that organises the CoP is not structured around an idea of learning a specific topic or acquiring a particular subject. Rather the learning is an inevitable outcome of participating as an engaged member in the forum.

The anticipatory experiences are not only restricted to the phases of becoming a Tesla owner, but also to the phase of being a Tesla owner. The car's digitised and connected functionality provided: continuously updated functionality through Over-The-Air (OTA) updates; pre-ordering offers of future functionality; and taking part in the

development as a Beta software tester. All these provided possibilities for owners to share their anticipation of the future developments and experiences.

Our findings provide an example of how the trends of subscription-based ownership, digitalisation and open platforms encourage a form a social self-organisation, through which users learn to become car owners, experience the car and evolve the overall UX. Thus, offering a new understanding of how UX of a product extends beyond its physical form. In the next section we elaborate on this.

## 5.2 Extending the understanding of the situational and temporal aspects of UX

The attention to context of use and anticipated use, often named key factors of UX, are rarely researched (Bargas-Avila and Hornbæk 2011). The limited existing studies (Karapanos et al. 2009; Yogasara et al. 2011) have not fully accounted for how anticipation and expectation are implicated in the user's management of multiple ongoing trajectories, plans or instant protentions as these might be experienced in physical or digital forms.

Battarbee's and Koskinen's (2005) concept of co-experience builds on the understanding that experiences are not only individual and that social interaction is the enabler of experiences. We agree with Battarbee that neglecting the social aspects in UX leads to a limited understanding of user experience, and a similarly limited understanding of design possibilities.

By taking a social perspective and attending to its temporality we developed a new and wider approach in order to advance UX research beyond the more static and isolated user-product perspective. Using netnography to study a self-organised online car brand community enabled us to both study the phenomena of anticipatory UX outside the moments of use and follow how the social context impacted on the overall UX of the car. Following forum members' postings back in time enabled us to understand how individual experiences evolved.

From our previous work (Lindgren, Fors, et al. 2018), figure 2 shows the different modes of anticipation and trajectory of becoming a Tesla owner identified in our earlier study, through five anticipatory experiences that lead members to engage deeper in the Tesla CoP and move forward through its process: *Sharing values*, *Justification and planning*, *Encouraging feeling*, *Accommodating activities*, and *Sharing know-how*. The different ways of learning how to be a Tesla owner in the Tesla CoP were not connected to a specific order of steps in the trajectory. Instead users could be active in any step in the process. Their development as Tesla users (and potential owners) formed a circular tra-

jectory, which commenced with imagining a future state where they were Tesla owners and then moving from the digital materiality of the car towards its physical materiality, which in turn engendered more new experiences. This followed into different modes of anticipation through which new members started to imagine their own future Tesla ownership. The arrow from owners sharing their new life with a Tesla connects to the circular process and shows how their shared experiences fed into new non-Tesla owners' anticipatory experiences of becoming car owners, or of news and experiences of the latest software updates of the cars.

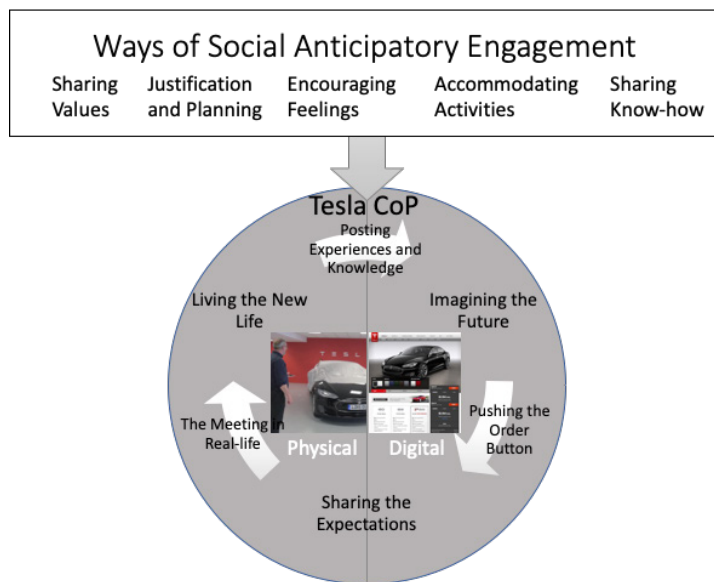


Figure 2. Circular process of evolving anticipatory experiences and ways to become a Tesla owner, modified from (Lindgren, Fors, et al. 2018)

The process of buying a Tesla and the anticipatory experiences it entails start with the owner's urge to share and to experience something that is more than just the car itself. Through this process a positive UX of the digital car is created through sharing anticipatory experiences between members.

### 5.3 Implications for UX design

On the basis of our findings we propose three main implications for UX design for products and services, which emphasise the design of UX for digital materialities.

First, we suggest that UX design will benefit the development of the digitalisation and connectivity functionality related to services of the car. It could enable users' self-organised CoPs to develop and provide users with tools for sharing their anticipatory experiences and becoming engaged in product and service development.

Second, providing products and services with fast evolving software iterations, could enable anticipatory experiences to continue to evolve during use and engage other users and their UX.

Third, our study demonstrates that the digital and physical materialities of a product or a service should not be viewed as separate elements of experience and must be designed in combination for a holistic UX. Thus, when the experience of a physical product extends and shifts towards also being a digital and social experience, the definitions and boundaries of where the UX starts and ends correspondingly change for both the user and the product industry.

To summarize, UX research is still developed as a response to the third wave challenges Bødker (2006) identified over a decade ago. Contemporary dominant UX research and frameworks have not yet adequately incorporated the effects of the changes of digitalisation, subscriptions or continuous OTA where users blur boundaries of why, how, where and when UX occurs. We argue that socially shared anticipatory experiences are an important part of the overall UX, in the contexts of both the digital and physical representation of the product or service. This leads us to reinforce two key points:

First, a social science perspective advances UX research, through an emphasis on socially shared anticipatory UX. This enables us to better understand how anticipation and social interactions affect the choice of a product or a service.

Second, if we take anticipation seriously, then our focus needs to go beyond how products are imagined before use, to also account for how users engage with a product before it is used. Therefore, anticipation goes beyond being prior to the user's experience of a product, to being part of the overall UX and how it evolves.

### 5.4 Limitations

The study is based on a small sample of users who participate in a specific type of car community forum, and could be referred to as early adopters. Compared to other well known research methodologies for capturing experiences; e.g.; the Experience Sampling Method (ESM) or the Day Reconstruction Method (DRM) (Kahneman et al. 2004),

our aim was to explore and find evidence of the phenomenon of anticipatory UX, rather than quantifying or measuring its effects. The ethnographic approach to following how anticipatory UX emerged on-line provides a way to follow how social discussions evolve without interruptions or biased effects from questionnaires. Although the ethnographic approach limits the generalisability of our results, it is a fruitful way of identifying new research strands. In this case it fulfilled the purpose of demonstrating the phenomenon of anticipation and the different ways in which it emerged in everyday life. This moreover demonstrates the need for future research in two areas: first, to be able to generalise results we need to determine if the same phenomena is found amongst other groups of users and for other products; second, we need further investigation of the implications of anticipatory experiences for UX products and services which are designed to offer the circumstances in which socially shared experiences might evolve.

## 6 Conclusions

In this article we have demonstrated how shared anticipation through social media is part of the UX of the digitalised car. Our findings showed that members' activities in the Tesla car community forum <http://www.teslaclubsweden.se> continuously evolved their UX of the car through sharing their anticipation online. Current UX research is mostly engaged in the momentary use of products and has so far not managed to look deeply into the temporality of early or evolving UX or the phenomena of socially shared anticipation of a product and how it contributes to overall UX. We used Tavory and Eliasoph's theory of social anticipation to explain how different members' anticipatory trajectories and plans, shared online, contributed to and aligned with others' trajectories and plans to anticipate and experience how to become a Tesla owner or what the next update for the car will provide. The study contributes to UX research by demonstrating how Anticipatory UX continuously evolves as a specific type of experiences, rather than a static state before or during the moment of use, which has dominated previous anticipation research concerning UX. We show how social interactions between users in a community of practice generated trajectories that shape how UX evolves. We propose that we need to give careful notice to the sociomaterial process through which UX emerges, which we call *Anticipatory* UX, an evolving socially characterized UX, which occurs when the various digital representations of the product become available through e.g an online forum.

As traditional products like cars are increasingly digitised and automated and are becoming services, they become experienced in new and different ways and are continuously evolving. We argue that in this context there is a need for further UX research

focusing on the characteristics of socially shared anticipatory UX. Rather than aiming for the perfect destination of UX at a specific moment with a finished product, we suggest that the key to success might be found by revising this vision. Instead we propose designing opportunities for a user journey over time, which involves evolving anticipatory experiences that are easily shared between users.

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